Fauquier County Parks and Recreation

A publication of the Parks and Recreation's Stewardship Team to increase awareness of the environment so staff can set an example for protection of the environment.
Vol. IV, No. 12

The Steward's Ship

ENERGY USED TO MAKE COMMON PRODUCTS

Bottled Water and Energy: A Fact Sheet

The growing consumption of bottled water raises questions about the product's economic and environmental costs. Among the most significant concerns are the resources required to produce the plastic bottles and to deliver filled bottles to consumers, including both energy and water.

The Pacific Institute estimates that in 2006:

Producing the bottles for American consumption required the equivalent of more than 17 million barrels of oil, not including the energy for transportation

Bottling water produced more than 2.5 million tons of carbon dioxide

It took 3 liters of water to produce 1 liter of bottled water

Total U.S. Consumption of Bottled Water in 2006

According to the Beverage Marketing Corporation, Americans bought a total of 31.2 billion liters of water in 2006, sold in bottles ranging from the 8-ounce aquapods popular in school lunches to the multi-gallon bottles found in family refrigerators and office water coolers. Most of this water was sold in polyethylene terephthalate (PET) bottles, requiring nearly 900,000 tons of the plastic. PET is produced from fossil fuels – typically natural gas and petroleum.

Energy Required to Make PET Plastic

According to the plastics manufacturing industry, it takes around 3.4 megajoules of energy to make a typical one-liter plastic bottle, cap, and packaging. Making enough plastic to bottle 31.2 billion liters of water required more than 106 billion megajoules of energy. Because a barrel of oil contains around 6 thousand megajoules, the Pacific Institute estimates that the equivalent of more than 17 million barrels of oil were needed to produce these plastic bottles.

Carbon Dioxide Emissions from Consumption of Bottled Water

The manufacture of every ton of PET produces around 3 tons of carbon dioxide (CO_2). Bottling water thus created more than 2.5 million tons of CO_2 in 2006.

Water Required to Make Bottled Water

In addition to the water sold in plastic bottles, the Pacific Institute estimates that twice as much water is used in the production process. Thus, every liter sold represents three liters of water.

Transporting and Recycling Bottled Water

More energy is needed to fill the bottles with water at the factory, move it by truck, train, ship, or air freight to the user, cool it in grocery stores or home refrigerators, and recover, recycle, or throw away the empty bottles. The Pacific Institute estimates that the total amount of energy embedded in our use of bottled water can be as high as the equivalent of filling a plastic bottle one quarter full with oil.

Recommended Solution to the Bottled Water Energy Use Problem:

Purchase a good re-usable, chillable beverage container and obtain water from at-home filtered source. Re-usable fluid containers can be filled with tap water or from a port-able filtering system like Brita Brand. Additionally, re-usable containers can be filled with fruit juice drinks! You will not only be saving the bulk plastic waste from water bottles but also all the energy used in their production and handling!

Personal beverage bottles:

http://www.discountmugs.com/nc/category/sports-bottles/

Plastic Recycling Facts: According to the Beverage Marketing Corp, the average American consumed 1.6 gallons of bottled water in 1976. In 2006, that number jumped to 28.3 gallons.

More than 2.4 billion pounds of plastic bottles were recycled in 2008. Although the amount of plastic bottles recycled in the U.S. has grown every year since 1990, the actual recycling rate remains steady at around 27 percent.

Next Page Please...

In 2007, more than 325 million pounds of wide-mouth plastic containers were recovered for recycling. (This included deli containers, yogurt cups, etc.)

In recent years, the number of U.S. plastics recycling business has nearly tripled. More than 1,600 businesses are involved in recycling post-consumer plastics.

Plastics in the U.S. are made primarily (70 percent) from domestic natural gas.

Plastic bags and product wraps (known collectively as "plastic film") are commonly recycled at the many collection programs offered through major grocery stores.

Recycling 1 ton of plastic saves 7.4 cubic yards of landfill space.

During Keep America Beautiful's 2008 Great American Cleanup, volunteers recovered and recycled 189,000,000 PET (plastic) bottles that littered highways, waterways and parks.

The Energy Consumed to Use Paper and Plastic Bags

While polyethylene plastic bags require substantially less energy and water than paper bags, using either type of single-use bag consumes much more energy in the long-term than reusable bags. According to Resource Conservation Manitoba and reusablebags.com, the US consumes one billion plastic bags annually (about 330 per person), which require 12 million barrels of oil to produce. On today's commodities market, 12 million barrels of oil cost about $1,284,000,000.

Plastic shopping bags are an unnecessary expenditure of petroleum when we can instead carry reusable bags and the oil used to produce plastic bags could be better saved for other products.

Paper bags require much more energy to produce than plastic bags. According to a 2007 life cycle assessment conducted by the American Chemistry Council, 2,622 mega joules (MJ) of energy are consumed for every 1,000 paper bags used, from their production to their disposal. This is nearly 3.5 times the energy required for the same carrying capacity (about 1,500 bags) of polyethylene plastic (763 MJ). The life cycle of paper bags also consumes more than 50% more fossil fuels than that of plastic bags. The difference in water use is even more extreme- 1,004 gallons are used in the life cycle of 1,000 paper bags while 58 gallons are consumed for the same carrying capacity of plastic bags. When taking energy efficiency into account, paper bags are not a viable alternative to plastic. It is more environmentally sound to regularly use reusable bags.

Compostable bags are also very energy intensive. According to the American Chemistry Council's life cycle assessment, compostable bags made from a blend of biodegradable polyester, poly–lactic acid and calcium carbonate use nearly three times the energy during their life cycle as polyethylene plastic (2,070 MJ) and gobble up more fossil fuels and water than paper.

While polyethylene plastic bags are more energy-efficient than paper and compostable bags all disposable bags present an unnecessary waste of energy, fossil fuels and water compared to reusable bags. According to the US EPA, a reusable bag need only be used 11 times to have a milder environmental impact than using 11 disposable plastic bags though it is important to keep in mind that different materials have different environmental impacts. The two-year life cycles of both cotton and polyester reusable bags require a fraction of the energy involved in using any type of single-use bag for two years, and we can save even more energy by using bags made from recycled or second hand materials. Reusable bags are also more economical than disposable bags as most stores offer discounts to shoppers who bring their own bags The reusable bags we invest in now will pay for themselves if we use them regularly. To save energy, water and money, remember to bring your own reusable bags when you go shopping.

Reusable Bag Source:
http://www.onebagatatime.com/our-product/

Floating Plastic Islands in the World's Oceans?

Yes, it's true.

What can you do to help?

Here's some other ideas and sources to save yourself money, save energy, and save the planet.

http://www.energysavers.gov/your_home/appliances/index.cfm/mytopic=10040

http://www.ehow.com/how_4545697_calculate-energy-used.html

http://www.dropyourenergybill.com/archives/1408

http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=WI